

avian stock as an independent offshoot at much the same time as did most of the other important families. It may be fairly asked what reason there is for the assumption that there was a sudden break up of the bird-type at any particular period. It appears to me from the study of anatomy that this was the case; and it is evident that the acquisition of wings by the previously terrestrial type form must have suddenly interpolated a large number of intruders into domains already occupied, and must have all at once called forth a new aerial struggle for existence, which, from the generalness of its action must, within a short time, have brought out a great number of special characters by natural selection.

EXPLANATION OF THE PLATES.

PLATE XII.

- Fig. 1. Proventriculus and gizzard of *Chauna derbiana*, cut open, and part of the front wall removed.
2. Anterior view of lower portion of windpipe of *C. derbiana*.
 3. Back view of same, the muscles of the left side having been removed.
 4. Right side view of same.
 5. Portion of right coracoid bone (*c*) with *coraco-brachialis longus* (*c.b.l*) and *coraco-brachialis brevis* (*c.b.b.*) *in situ*, of *Crax globiceps*. The *expansor secundariorum* (*e.s.*) is seen to spring partly from the first-named muscle.

PLATE XIII.

- Fig. 1. Cæca of *Chauna derbiana*, with the anterior wall partly removed to show the cavity intervening between the small and large intestine into which the cæca open.
2. The cæca, external view.

PLATE XIV.

- Fig. 1. Axillary muscles of right side of *Chauna derbiana*. *e.s.*, *expansor secundariorum*; *p 1*, great pectoral; *p 2*, second pectoral; *c.b.l.*, *coraco-brachialis longus*; *b*, biceps; *t*, triceps; *t.p.b.*, *tensor patagii brevis*; *sc*, scapula; *st*, sternum; *c*, coracoid; *f*, fureula; *h*, humerus; *c.v.*, cervical vertebra; *tr*, trachea; *S.R.*, secondary remiges.
2. The same part, left side, of *Gallinula chloropus*. *B. slip*, biceps slip; *t.p.l.*, *tensor patagii longus*.

PLATE XV.

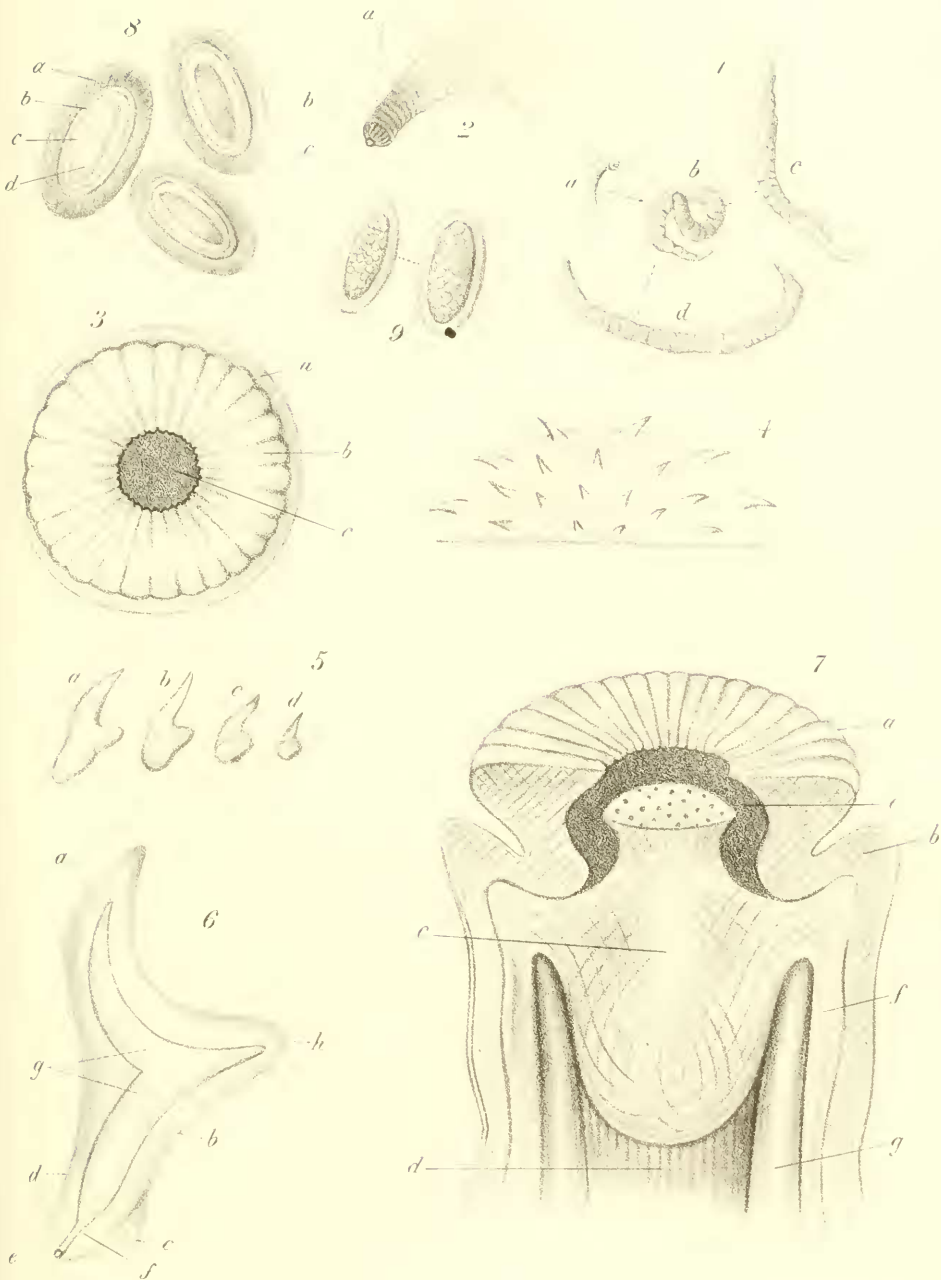
- Fig. 1. Muscles of right side of interior of pelvis and inner side of thigh of *Chauna derbiana*, the muscles of the anterior abdominal wall having been removed. *o.i.*, obturator internus; *Amb.*, *Ambiens*; *Quad.*, *Quadriceps extensor*; *Ad.*, *adductor*; *s.t.*, *semitendinosus*.
2. The same parts of *Euplocamus albocristatus*, similarly lettered. *sart.*, *sartorius*.

4. Notes on Entozoa. Part III. By T. SPENCER COBBOLD, M.D., F.R.S., F.L.S., Correspondent of the Academy of Sciences of Philadelphia.

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(Plate XVI.)

In continuing the "Notes" commenced in 1873, I may observe that I have recently received important additions from naturalists



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abroad. Although it so happens that comparatively few of the parasites are altogether new to science, yet most of the contributions present, in one way or another, points of interest. I propose in future to extend the character of my notes, not only recording new habitats and describing new species, but also paying regard to all facts tending to throw light upon the question of geographical distribution. I wish also to remark more fully on structural and morphological peculiarities, especially when dealing with aberrant types. The importance of certain species in relation to epidemics will also receive attention. None can regret more than myself the necessarily incomplete character of these records. It is evident, however, that if we home-naturalists defer all public notice of the receipt of specimens from co-workers abroad until we happen to have time at our command to do full justice to the contributions, a multitude of useful facts will inevitably be lost to science. In this connexion I may likewise observe that the mere verification of already known phenomena, especially in the matter of distribution, is not without its cumulative value.

8. *FILARIA TEREBRA* (Diesing).

On the 27th of February, 1875, Dr. Edward L. Moss, of H.M.S. 'Alert,' now engaged in the Arctic Expedition, brought me three examples of a nematode, which I have little hesitation in referring to this species.

Dr. Moss obtained these parasites in 1874, during the time that he had charge of the Naval Hospital at Esquimalt, Vancouver's Island, British Columbia. They occupied the abdominal cavity of the Black-tailed Deer (*Cervus columbianus*). The worms (usually one, but occasionally two, being present in each cervine bearer) were commonly found lying amongst the coils of the small intestine. They had not in any way attached themselves to the peritoneal membrane. I understood Dr. Moss to say, in conversation, that he had shot seventeen deer in all, the males and females being in about equal proportion; nevertheless not one of the bucks examined by him showed any trace of the presence of these entozoa. This absence of parasites in the male hosts can hardly, I should think, have been otherwise than accidental. Hitherto the worm appears to have been observed in the Red Deer (*C. elaphus*) and in three species of American Roe (*C. rufus*, *C. simplicicornis*, and *C. nambi*) by Natterer. Two of the worms measured each about $2\frac{1}{2}$ inches in length, the third exceeding 3 inches. The head of one was injured; but the other two displayed in profile two prominent oral papillæ. Probably there were four of these processes, such as Dujardin described in his *Filaria cervina*, which, according to Diesing, is a synonym of this species. The body is marked throughout its entire length by a series of prominent and regular folds, these, in some situations, becoming so conspicuous that, under an ordinary pocket-lens, they present a beaded appearance. All the specimens had their attenuated tails more or less spirally twisted; and a single brown-coloured line occupied the whole length of the body. The precise relations

of this narrow but well-marked band are worthy of further study. I believe the parasites were all males; but I was unable to detect the external sexual openings.

9. ECHINORHYNCHUS TRANSVERSUS (Rud.)

On the 18th of February, 1875, I received from Dr. Hooker, Pres. R.S., eleven examples of a small acanthocephalus worm for identification. They were obtained by his son, Mr. Charles P. Hooker, who subsequently informed me by letter that he had found them in a Redwing (*Turdus iliacus*) which he dissected on or about the 5th of January, 1875. It was also mentioned that the worms occupied the large intestine, probably to the number of one hundred in all. Hitherto this parasite has been found abundantly in the Blackbird, Thrush, and in most of the *Turdidæ*; but not, I believe, in the Redwing. It has also been obtained from the Starling and Redbreast.

The occurrence of so many of these armed parasites in one host is a noteworthy circumstance; and it is difficult to understand how they could be present in such numbers without inflicting severe injury on the bearer. Of course there is no proof that the bird did not suffer inconvenience: at all events, analogous facts of parasitism produced by other species of Echinorhynchi show that these Entozoa are occasionally productive of fatal results.

10. ECHINORHYNCHUS ECHINODISCUS (Diesing).

On the 1st of November, 1875, I received from Prof. Flower, F.R.S., a glass jar labelled as follows, "Entozoon found attached to intestine of the Tamandua Ant-eater." The parasite was obtained from the Society's Gardens on the 12th of August, 1871.

The Brazilian traveller, Natterer, originally obtained this worm from *Myrmecophaga jubata* and *M. bivittata*. Creplin described it from a *M. didactyla* from Surinam (Wiegmann's Archiv, 1849). I presume the *M. tamandua* answers to the *M. bivittata* of Geoffroy, as well as to the tridactyle and tetradactyle species of Linnæus.

The parasite in question appears to have been solitary. It is a female, measuring exactly 10 inches long. The annulations of the body commence about $\frac{1}{2}$ an inch from the head, and are continued on uninterruptedly with great regularity to the end of the tail. On the average, twenty rings may be counted to the inch; thus there are quite 200 altogether, as they are somewhat more closely packed towards the neck and also at the tail. The proboscis was firmly anchored within the gut; and I was unsuccessful in my attempt to dissect it out entire. For a space of $\frac{1}{4}$ of an inch in diameter at the point of anchorage, the intestine was opaque from inflammatory exudation.

11. ECHINORHYNCHUS ELEGANS (Diesing).

Six or eight years back, Dr. Murie placed in my hands a glass jar containing eight parasites. I could not examine them at the time; but on the 18th of April 1873 I made a careful study of the worms, briefly noting down the principal facts of structure. Although the

label on the jar was in places well nigh obliterated, I made out that the worms had come from a Monkey; but not being certain as to the species, I did not attempt the identification of the parasites. Dr. Murie has since further obliged me by looking up his notes; and on the 2nd of April 1875, he informed me by letter that the host was a Pinche Monkey (*Hapale adipus*). This well known Marmoset had been obtained from New Granada. The cause of the animal's death, which occurred at the Society's Gardens on or about the 30th of June, 1866, was not ascertained. I have not in this case observed any signs of inflammation in the intestine of the host, a portion of which, with several of the Entozoa remaining attached was also supplied to me. The mucous layer of the gut shows deep conical depressions at the spots where the detached worms had anchored themselves.

So far as I can make out, Diesing's original description of the parasite is the only one that exists. I have gone over his numerous memoirs contributed to the Vienna Accademy, but can find nothing beyond the specific characters given in his 'Systema.' All the specimens in the Vienna Museum, whence his description is taken, were collected by Natterer. They were procured from the Marakina (*Midas rosalia*), from two other true Marmosets (*Hapale ursulus* and *H. chrysoleucus*), and from a Squirrel Monkey or Tee-tee (*Callithrix sciureus*).

Though in one or two unimportant particulars our observations do not agree, Diesing's description is amply sufficient for the systematist's purpose. By referring to the four specimens which I have selected for illustration, it will be seen that all the worms were more or less bent upon themselves. The larger specimens present a tolerably uniform thickness throughout, the smaller ones being thicker behind and almost club-shaped (Plate XVI. fig. 1). In detached examples, the front end of the parasite is seen to support a narrow and long neck, which is usually well marked off from the body proper (*d*). It is more or less regularly annulated, the folds being continued downwards along the body, but gradually losing their regular arrangement. If the anterior extremity of the neck be examined with a powerful pocket lens, its abrupt and truncate surface will be seen to display a number of lines or grooves radiating from a common centre (fig. 2). During the perfect retraction of the proboscis the centre is represented by a clear space, or wide opening, which communicates with a cavity immediately beneath. The end of the neck thus forms a sort of collar, or rosette, made up of rays arranged like the spokes of a wheel. When the proboscis is exerted this collar is more or less convex, but it becomes slightly concave when the proboscis is retracted. Not improbably this attractive-looking surface suggested to Diesing the specific title which he gave to the worm. He recognized 24 rays: they probably vary from that number up to 28; at least, I counted 27 in the specimen (fig. 3). During exertion, the proboscis forms, to the naked eye, a nipple-like projection (fig. 2). According to Diesing it supports three rows of hooks; but I certainly saw four rows (fig. 4). When separately magnified these hooks present very different appearances